RESEARCH PLAN PROPOSAL

A Comparative Study of Kinanthropometric and Physiological Variables of Rural and Urban Football Players in Rajasthan

For registration to the degree of Doctor of Philosophy

IN THE FACULTY OF ARTS & SOCIAL SCIENCE

The IIS University, Jaipur

Submitted by
Mr. Deepak Sharma
Enrollment No. IISU/2012/10004

Under the Supervision of
Dr. Renu Shungloo
Head, Department of Physical Education

MAY-2013

TABLE OF CONTENT

1. **Introduction**

2. **Review of Literature**

3. **Justification and Relevance**

4. **Objectives of the Study**

5. **Hypothesis**

6. **Plan of Work and Methodology**

7. **Place Of Work And Facilities Available**

8. **Limitations & Alternative Plan of Study**

9. **Bibliography&Webliography**

INTRODUCTION

Fitness denotes a person status of physique in relation to its physical achievements. The latest scientific evidence also edict the fact that for internal or physiological soundness physical fitness is necessary. Modern physical educators divided the factor of fitness into skill related and Health related physical fitness. It is also an undesirable fact, that the health related physical fitness, which is main concern for physical educationists, is depended on the skill related physical fitness of an individual. It is also a high concern for a coach to develop various skills and for this the sportsperson's skill related physical fitness should be upgraded and developed. Physical fitness refers to the capacity of an athlete to meet the varied physical demands of their sport without reducing the athlete to a fatigued state. The components of physical fitness are: Strength, Endurance, Speed, Flexibility and Coordination.

Fitness is the term, which is widely used in the present day health conscious society. The people have realized the importance of fitness in day to day routines and also in achieving sports excellence.

Sports form an important aspect of life. They play a vital role in bringing about physical, mental and social growth of individual Bast few decades has witnessed many on innovations in this area. Sports are becoming increasingly sophisticated technically and gaining popularity as separate profession with expansion of educational facilities in the country. More young people are taking part in sports as a daily feature of their life. The participation in sports and physical fitness increases an individual’s productivity; It also promotes social harmony and discipline.

Various latest techniques and tactics based on scientific principles are introduced for coaching of various sports and games. Many diverse conditions can be

improved by the judicious control of all exercise and activity program. The perfect knowledge of physiological aspects of exercise is essential to prescribe the individualized type of exercise program to` meet the particular need of each person.

It is unwise to build a pyramid at the top without having built a base first. Similarly specialization in a branch of knowledge cannot be possible if the general concepts in the discipline are not clearly understood. This is very much applicably in case of physical education programme, where skills and techniques of any sport or game should be basically and mastered in the first instant.

The degree to which the cardio-vascular fitness contributes to a particular games or sports depends upon the type and variety of movements involved in them. In sports training much emphasis is laid on those components of physical fitness, which are most fundamental to those sports. For example training of long distance runner, cardio-vascular & muscular endurance are of prime importance, while for sprinting, development of strength, speed is given greater importance. Same is true in training of games such as Football, Basketball, Volleyball, Swimming etc. The complex nature of physical fitness includes the muscular strength, muscular endurance, cardio- respiratory endurance and the most important of them is the cardio- respiratory endurance.

By nature human being are competitive and aspire from excellence in every field. Sport is not an exception. Changes are the order of the day. Changes are taking place every day in every walk of life. Life of people, their philosophy, ways of living etc. are undergoing changes due to basic and applied research in various fields. Man has reached the Space age from the primitive Stone Age because of continuous change. New techniques are developed in laboratories and scientific methods are applied to obtain top-level performance. Sports by their very nature

are enjoyable, challenging, absorbing and require a certain amount of skill and physical condition.

With all round advancement in the science of sports the new disciplines are emerging with micro-specializations. The elements, of scientific basis of selection are being inducted in the procedure of selection of athletes at various levels in some of the advanced countries. The knowledge from many scientific disciplines is being used for improving the criteria for the selection of talents. The physical educationists have designed test procedures for evaluating the fitness of young children. The structure of performance for different games and events is being worked out. The general physical fitness of top—ranking athletes has been evaluated. Human growth and performance is also an important field in this regard. The physiological factors limiting one's performance in sports are also well known. It is the understanding of interaction of all these factors that can help us in designing the way for selecting the children for appropriate game and training.

During the last decade in many advanced countries, the "Muscle Biopsy" technique, whereby samples from skeletal muscles of healthy people are obtained and have been widely applied "to catch them young" Recently, "histological and histochemical techniques have also been applied to identify different fibre types in the skeletal muscles of man. This is then used to correlate the contractile characteristics of their functions and metabolic potentialities in various athletic events by determining different enzyme activities. It has become popular to determine muscle fibber composition of athletes involved in different types of events. Regarding the relative distribution of ST (slow twitch) and FT (Fast twitch) fibres, the most interesting findings are that long distance runner has a marked predominance of ST (slow twitch) fibres in their leg muscles.

Historical Developments of Kinanthropometry

Kinanthropometry is the study of human body measurement for use in anthropological classification and comparison. Among the techniques used in modern kinanthropometry, anthropometry has the longest history.

Anthropologists and archaeologists also have a long tradition of the use of anthropometry, particularly relating to skeletal measurement. Late in the 19th century, several meetings were held to agree upon standards of measurement for anthropometry. The 13th International Congress of Prehistory, Anthropology and Archaeology, held in Monaco, 1906, are recognized for the first agreements. A subsequent meeting in Geneva, 1912, at the 14th International Congress of Anthropology and Archaeology, supplemented the agreements at Monaco. A copy of this Report is reproduced in Alex Hrdli, Practical Anthropometry, Philadelphia: The Wistar Institute (1939). The book also contains descriptions of instruments and techniques of measurement.

In 1914, Rudolph Martin formalized the methods in his book Lehrbuch der Anthropologies, and in subsequent revisions up until the late 1950 (with co-author, K. Saller). The methods of this German school dominated anthropometry in general during the first half of the 20th century. This influence spread into the United Kingdom and was soon seen incorporated into Sport Science and Sport Medicine research in North America.

In September 1978, kinanthropometry became an officially-recognized discipline in its own right at a meeting of the Research Committee (RC) of the International Council of Sport Science and Physical Education (ICSSPE) in Brazil,

Today, kinanthropometry continues to grow in popularity and application with senior practitioners found in all five continents and with its own international society, the International Society for the Advancement of Kinanthropometry (ISAK), to promote and foster its goals.

The aim of kinanthropometry is to improve understanding of the gross functioning of the human body by measurement of its size, shape, proportions and composition and relating these to health, exercise and performance. A central interest is that of physical performance, in particular, though not limited to, sport performance. By examining the relationship between body measurements and aspects of performance, kinanthropometry helps in optimizing training to improve performance, and also helps to reduce injuries. It is useful for children, to aid in the early recognition of athletic potential, and to examine the impact of early training on their growth and maturation. It serves an important function in assessing the relationship between exercise, nutrition and health, from the requirements of normal growth to the effects of ageing on the body, to the evolution and characteristics of the expression of different disease processes in the body. Gross functioning may also refer to applications other than sport: kinanthropometry is ideally suited to ergonomics, the optimization of the fit between worker and workplace. A further important function of kin anthropometry is to improve, validate and standardize techniques for the measurement of the human body.

The root words in kinanthropometry refer to movement, humans and measurement. In less simplistic terms, it is the study of human size, shape, proportion, composition, maturation and gross function (Ross, 1978). The discipline has a long history, since height and weight, the two simplest and most commonly used measures in kinanthropometry, have been measured for many centuries. Increasing sophistication led to the modern fields of anthropometry and biometry, and much has been written on these topics. The classic reference is Lehrbuch der Anthropologies (Martin and Saller, 1957), but Rudolph Martin earlier work (1914) and the description of the measurements carried out in the International Biological program (Weiner and Lourie, 1969) are important additions. ISAK has modified the detailed descriptions by Ross and Marfell-Jones

(1991) and Norton et al. (1996), to produce a new manual, International Standards for the Anthropometric Assessment, (ISAK, 2001 and 2006), in an effort to bring uniformity to the techniques in anthropometry. Since 1996, ISAK has operated an international Anthropometry Accreditation Scheme with four levels of expertise. To date, about 2 500 people from more than 20 countries have been certified.

Our quantitative knowledge of human physique and composition includes the classic work of Sheldon (1954). Somatotyping was made more rigorous in a series of publications by Carter and Heath, starting in 1966 and culminating in their definitive volume in 1990. No discussion of body shape and proportion would be complete without reference to the brilliant work of D Arcy Thompson (On Growth and Form, 1917) and the application of algometry to growth by Huxley (1932). A comprehensive summary of our knowledge relating anthropometry to human growth is given by Edith Boyd (1980) in her treatise Origins of the Study of Human Growth.

Kinanthropometry has been used to examine performance related variables in world class athletes (e.g. Carter, 1984; Carter and Ackland, 1994; Rienzi et al., 1998). It has been used in a wide range of cultural settings to investigate factors affecting nutritional status (e.g. Himes, 1991), and has been applied extensively in western countries in studies investigating health aspects of atypical fatness, ranging from extreme obesity to the emaciation of anorexia nervosa, and to the effects of exercise on the body fat distribution. The role of different types of physical activity in the health of the skeleton is an area of much contemporary interest, and new, sophisticated techniques for assessing bone, such as dual-energy X-ray absorptiometry and magnetic resonance imaging, are now included in the spectrum of kinanthropometric methods.

REVIEW OF RELATED LITERATURE

This chapter deals with literature related to the present study. The research scholar has gone through all the available literature and the literature found relevant to the present study has been presented in this chapter.

Mathews, D.K. (1978) states that physical fitness is a part of total fitness. It could be defined as the capacity of an individual to perform given physical task involving muscular efforts. As the terms physical fitness is somewhat exact units meaning, indicating thus specific components we height measure to reflect a person's fitness status. The sensible organic ingredients of physical fitness include muscular power, muscular flexibility and neuro-muscular co-ordination.

Clark, H. H. & Clark, D. H. (1987) states that physical fitness is the capacity to do prolonged based work and recover to the same state of health in short duration of times. This is the result of the degree of strength, speed, endurance, agility, power and flexibility one possesses. Since physical fitness covers motor fitness, so the programme of physical fitness should involve development of certain basis elements like strength, speed, agility, power, flexibility and endurance. Those physical fitness elements are useful for different games and sports. Strength is important in wrestling and boxing, where as endurance is important, for distance runners, degree of demands, differs in different games as strength is different for a long distance runner than a hockey, football players.

Marccus et al. (2004) is a study to compare selected physical fitness and performance variables between National Collegiate Athletic Association (NCAA) Division I and II football players. The subjects included offensive and defensive starters, excluding kickers and punters from 26 NCAA Division I and 23 Division II teams. Offensive players were grouped and compared by the following

positions: quarterback, running back, wide receiver, tight end, and line. Defensive players were grouped and compared by the following positions: line, linebackers, and backs. Division I players were better in 58 of 117 comparisons (p # 0.01). Division II players were not found to be better in any of the variables studied.

Duncan, Woodfield, & Al-Nakeeb (2006) was investigated the anthropometric and physiological characteristics of junior elite volleyball players. For this he selected Twenty five national level volleyball players (mean (SD) AGE 17.5 (0.5) years) and assessed then on a number of physiological and anthropometric variables. Somatotype was assessed using the Heath-Carter method, body composition (% body fat, % muscle mass) was assessed using surface anthropometry, leg strength was assessed using a leg and back dynamometer, low back and hamstring flexibility was assessed using a leg and back dynamometer, low back and hamstring flexibility was assessed using the sit and reach test, and the vertical jump was used as a measure o flower body power. Maximal oxygen uptake was predicted using the 20 m multistage fitness test. The results of the investigation showed that Setters were more ectomorphic 9p<0.05) and less mesomorphic (p<0.01) than centers. Mean (SD) of somatotype (endomorphic, mesomorphy, ectomorphy) for setters and centers was 206 (0.9), 1.9 (1.1), 5.3 (1.2 and 2.2 (0.8), 3.9 (1.1)3.6 (0.7) respectively. Hitters had significantly greater low back and hamstring flexibility than opposites. Mean (SD) for sit and reach was 19.3 (8.3) cm for opposites and 37 (10.7) cm for hitters. There were no other significant differences in physiological and anthropometric variables across playing positions (all p>0.05). He concluded from the results of this investigation that Setters tend to be endomorphic ectomorphs, hitters and opposites tend to be balanced ectomorphs, whereas centers tend to be ectomorphic mesomorphic.

Bester, M. Crous, M.M. Kidd, L.C. Harle , M. & Hary Y.X.R. (2007) was study conducted to assess the gluteus maximums and hamstring strength in

asymptomatic elite female field hockey players in order to obtain baseline data. Twenty elite female field hockey players participated in the study. Isometric force, eccentric and concentric torque of the left and right gluteus maximums and hamstring were measured in standing through 30-0 hip flexion using a Kin-Com Dynamometer set at 30 / second. Measurements were taken over six days. The mean over the 20 subjects for each test was used for calculations. The Analysis of variance demonstrated that the right gluteus maximums had a significantly higher isometric peak force, concentric and eccentric torque ($p < 0.01$) compared to the left gluteus maximums. The asymmetry found in hip extensor muscle strength in asymptomatic hockey players could be due to normal adaptation to the sport.

Niekerk, L. V. Coetzee, M. Monyeki, M.A. & Pienaar, A. (2007) was study to determine the anthropometric and motor development profile of a selected group of street children in Potchefstroom, in the North West Province, South Africa. A sample of 28 street children living in a state-owned shelter (20 boys and eight girls) between the ages of 7 to 14 years participated in the study. The anthropometric measures included stature, body mass, body-mass index (BMI), and two skinfolds (subscapular and triceps) and were measured according to the protocol of the International Society for the Advancement of Kinanthropometry (ISAK). The Bruininks-Oseretsky Test of Motor Proficiency, the Sensory Input Screening Instrument and a section of the Quick Neurological Screening Test II were applied to determine the motor development profile of the street children. The results of the anthropometric measures showed that the street children are shorter, lighter and have a lower BMI and smaller skinfolds than the norm for children of the same age. Signs of malnutrition were also noted. The results showed deficits in all the three aspects of motor development that were tested. With regard to the gross motor development, deficits were found with regard to running speed and agility, bilateral coordination and strength. Fine motor deficits were found in upper

limb speed and dexterity, response speed and visual motor control. The neuromotor development of street children also showed deficits, especially with regard to vision.

Cormery, B. Marcill M. & Bouvard, M. (2008) To evaluate, by examining data collected on professional basketball players during a 10-year period, the differences in aerobic capacity in function of the playing position and the impact on these parameters of the change in time regulation of 2000, which shortened the time allowed to attempt a field goal by 6 s and divided the duration of play in four quarters. Twice a year between 1994 and 2004, professional basketball players (n=68) were studied for anthropometric characteristics and were submitted to an incremental exercise test on a cycle ergometer. Statistical analyses were carried out to determine the interaction between the playing position and the effect of the change in time regulation on the physiological characteristics of the players. Anthropometric measurements were different in function of the playing position, the centers being taller and heavier than the forwards and the guards. Guards exhibited the highest Vo_2max (54.0 (SE 1.6) ml/min/kg) and were the most affected by the change in time regulation of 2000 with a 19.5% increase. Significant main effects of “before” versus “after” rule changes were found for maximal and submaximal O_2 consumption, which were increased by 12.8% at ventilatory threshold, 7.3% at respiratory compensation point and 7.8% at Vo_2max.

While anthropometric characteristics remained constant during the last decade, the change in rule of 2000 may have contributed in modifying the physiological profile of basketball players, by generally increasing their level of fitness.

Abraham, G. (2010) was study to analyze the anthropometry and body composition associated with performance of university level male track and field athletes of South India. This study was conducted on 93 track and field athletes from South India, comprised of 22 sprinters (100 & 200 mts) mean age 19.5 years, height 172.1 cm and weight 68.2 kg, 20 middle distance runners (800 & 1500 mts), mean age 19 yrs, height 166.8 cm and weight 62.5 kg, 16 long distance runners (5000 & 10000 mts), mean age 18.7 years, height 167.2 cm and weight 62.1 kg, 20 throwers, (shot, discus & hammer throw), mean age 19 years, height 170.8 cm and weight 72.6 kg and jumpers (High, long & triple jump), mean age 18.3 years, height 169.9 cm and weight 64.1 kg. Besides height and weight, six skin folds (triceps, chest, subscapular, abdomen, suprailiac & calf), two bicondylar breadths (humerus & femur) and two girths (biceps & calf) were measured. Somatotype evaluations were made according to Carter and Heath (1990) method. BMI was calculated as body mass divided by square of height (kg/m2). The somatochart indicated that sprinters and middle distance runners are ectomorphic mesomorphs, long distance runners are mesomorph ectomorphs while throwers are endomorphic mesomorphs. The jumpers fell into the somatotype category of balanced mesomorphs. Among all groups body fat percent is lowest in sprinters (6.23±0.83%) and highest in throwers (7.38±0.85%). This was reflected in their endomorphic components which is lowest in sprinters (2.53±0.45) and highest in throwers (3.39±0.65). Ectomorphic component is highly marked in long distance runners (3.56±0.65) while mesomophy was highest in sprinters (4.31±0.91). Throwers have significantly higher values of skin folds than other groups.

Compared to their overseas counterparts, the athletes of both track and field events in the present study exhibited greater endomorphic values.

Dey, S. K. Kar, N. & Debray, P. (2010) was study to carried out on one hundred fifty (150) male Indian footballers of six different national clubs of India including three from Kolkata (East Bengal, Mohan Bagan & Mohammedan Sporting) and other three from Goanese clubs (Salgaokar, Vasco & Dempo). The players were also sub-divided according to their specific field positions. Physical and physiological profiles including height, weight, percentage body fat (%BF), flexibility, agility, explosive power, and VO2 max were measured by standard procedures. It was noted that the mean values of age, height, weight and %BF were significantly different among footballers of different national clubs. Among the motor ability and physiological qualities only flexibility, agility and VO2 max were significantly different among the footballers of different national clubs ($p<0.01$). It was also observed that the mean values of height, weight, vertical jump and VO2 max of Indian national club players were found to be inferior to those of European, American and Australian footballers. However, the %body fat of Indian footballers according to their specific field positions was found to be comparable with their international counterparts. The defender, midfielder and striker of the present study were inferior in endurance (VO2 max) as compared to their international counterparts. Genetic factors may be the cause of smaller body size of the subject of the present study as compare to their international counterparts. So, it can be concluded that the differences among the footballers of present study with their international counterparts and specific playing position is probably the cause of hereditary factors and differences in activity in the game.

Gaurav, V. Singh, M. & Singh, S. (2010) was study to compare the anthropometric characteristics and somatotype of the Guru Nanak Dev University, Amritsar's male basketball players and volleyball players. Sixty three

sportspersons (volleyball=36 and basketball=27) of age group 18-25 years were selected from different colleges affiliated to Guru Nanak Dev University, Amritsar, Punjab, India. All the participants were assessed for height, weight, breadths, girths and skin fold thickness. An independent samples t-test revealed that basketball players had significantly higher height ($p<0.01$), weight ($p<0.01$) and body surface area ($p<0.01$) as compared to volleyball players. The basketball players were also found to have significantly greater biceps ($p<0.01$) and suprailliac ($p<0.01$) skin fold thicknesses, calf circumference ($p<0.05$), percent body fat ($p<0.01$), total body fat ($p<0.01$), fat free mass ($p<0.05$) and endomorphic component ($p<0.05$) as compared to volleyball players. Volleyball players had significantly greater body density ($p<0.01$) as compared to basketball players. The basketball and volleyball players of this study were found to have higher percentage body fat with lower body height and body weight than their international counterparts.

Karkare, A. (2011) was study to compare anthropometric measurements and body composition of hockey players with respect to their playing position. Two hundred and ten junior national hockey players seventy each from half line, back line and forward line was selected different state of India. Anthropometric measurements including height, weight, diameter, breadth, girth, and skinfold thickness was taken from entire subjects. Body composition was measure with the help of Matiegka's method (1921).To find out significant difference statistical method one way ANOWA was performed. Results found that, hockey players playing in different position found to be differ on some anthropometric measurements and body composition.

Koley et. al. (2011) was study threefold: firstly, to evaluate the arm anthropometric profile of Indian inter-university basketball players; secondly, to search for the correlations among these arm anthropometric characteristics; and thirdly, to search for the association of handgrip with arm anthropometric

characteristics in Indian inter-university basketball players. Three anthropometric characteristics, nine arm anthropometric characteristics, and grip strength of both right and left hand were measured on randomly selected 60 Indian inter-university basketball players (35 males and 25 females, aged 18–25 years) of six universities, who participated in the Inter-university Championship organized at Guru Nanak Dev University, Amritsar, Punjab, India. An adequate number of control subjects were also taken from the same place for comparisons. The results indicated statistically significant ($p \leq 0.05$ - 0.01) differences between the male basketball players and the controls in height, right handgrip strength, upper arm, forearm and total arm length, whereas no significant differences were found between the female basketball players and the controls. Highly significant ($p \leq 0.01$) sex differences were found in the basketball players in almost all the variables studied (except BMI and arm fat area). Significant positive correlations were noted among the arm anthropometric characteristics studied (except arm fat area and arm fat index), and with right and left handgrip strength.

Singh, S. Singh, K. & Singh, M. (2011) was study to find out anthropometric measurements, body composition and somatotyping differences in high performer and low performer hammer throwers. 20 male hammer throwers of age 18 to 25 years were assessed for the study. Out of which 10 were high performers and 10 were low performers. All subjects were assessed for height, weight, widths, girths and skinfold thickness. The independent samples t-test revealed that high performer hammer throwers had significantly higher weight ($p<0.01$), sitting height ($p<0.05$), BMI ($p<0.01$) and lower leg length ($p<0.01$) as compared to low performers. The high performer hammer throwers were also found to have significantly greater all circumferences and skinfold measurements. High performers hammer throwers also had significantly higher % body fat ($p<0.01$),

total body fat ($p<0.01$) and lean body mass ($p<0.01$) as compared to low performers. Endomorphy ($p<0.01$) and mesomorphy ($p<0.01$) were significantly higher in high performer hammer throwers whereas ectomorphy ($p<0.01$) was significantly greater among low performers. It is concluded that in most of the parameters there were significant differences between high performer hammer throwers and low performer hammer throwers, and the high performer athletes showed better anthropometric measurements and somatotyping scores.

Al-Hasso, R. A. (2012) study to finding out the effect of running 800 m in an equal intensity in the field and treadmill on some physiological and Kinematical responses. The sample of the research consisted of (6) athletes. The researcher applied descriptive method due to its appropriateness with the nature of the research. The researchers applied test and measurements as tools to collect the required data. The test was running 800 m twice throw 3 days. The first was running 800m on the field and after 2 days, they applied the second test which also was running 800 m but on treadmill. Then after two tests immediately, the researchers measured the physiological variables which included the measuring of (Hr, Sbp, Dbp, RR) as well as the time of running, the researcher calculated the kinematical variables too which included the length, time, speed, frequency of the step. The researchers applied the following statistical tools: (Mean, Slandered deviation, variance, coefficient, percentage T-test for independent sample).The results show significant differences when comparing the values of physiological and kinematical in pre 800m running using field pre using treadmill.

Karkare, A. & Bhotmange, S. (2012) was study to compare body composition and Aerobic capacity of handball players participated in different level of competition. One hundred and twenty handball players in which forty participated in district level, forty participated in state level and forty participated in national

level has been selected from Vidarbha region of Maharashtra state as a sample of the study. The average age of selected samples was 20.53 years. To find out body composition of handball player's anthropometric measurements i.e. height, weight, triceps skinfold, sacroiliac skinfold and subscapular skinfold were taken from selected handball players. To find out fat weight and lean body mass Matiegka's method (1921) was used. To find out aerobic capacity of handball players participated in different level of tournaments Cooper's 12 minute run/walk test was conducted. Result found that handball players which represented national level tournament have shown their superiority on body composition and aerobic capacity.

Priya, K. B. Gopinath, R. & Raja, S. C. (2012) was study to find out the effect of yogic practices and physical exercises on blood glucose and high density lipoproteins among diabetes patients. To achieve this purpose, 45 women diabetic patients were randomly selected as subjects. The age of the subjects ranged from 35 to 40 years. The subjects were divided into three equal groups of 15 subjects each in which group - I underwent yogic practices, group – II underwent physical exercises for five days per week for eight weeks and group - III acted as control who did not undergo any special training programme. The selected criterion variables such as blood glucose and high density lipoproteins were assessed before and after the training period. The collected data were statistically analyzed by using Analysis of Covariance (ANCOVA). From the results of the study it was found that there was a significant decrease in blood glucose and increase in high density lipoproteins for both the training groups when compared with the control group.

Sharma, A. Tripathi, V. & Koley, S. (2012) was study to investigate the correlations of anthropometric characteristics with isotonic strength (handgrip strength), lower limb power, aerobic strength, and skill tests in purposely selected

60 Indian professional male hockey players of different levels players (35 national and 25 state level) aged 18-23 years collected from Ranjit Singh Hockey Academy, Amritsar, Punjab, India. To serve this purpose, three anthropometric characteristics (height, weight and percent body fat), right and left handgrip strength, vertical jump, multi stage fitness test, slalom sprint and dribble tests were performed on each subject. Results indicated statistically significant ($p<0.05$) differences only in lower limb power between Indian national and state level male hockey players. In Indian professional male hockey players, height has significantly positive correlations with weight, right and left handgrip strength, lower limb power and negative correlations with % body fat and dribble test, and body weight has significantly positive correlations with % body fat, right and left handgrip strength, lower limb power and negative correlations with slalom sprint. Significantly positive correlations were noted among the fitness component variables too.

Singh, A. B. (2012) was study to assess the selected anthropometric measurements among the boys aged 6 through 9 years. For this purpose a coca/ of 200 boys aged 6 through 9 years were selected randomly (50 boys in each age group). The anthropometric variables selected were weight, height, waist circumference and hip circumference. To find out t h e relationship between BMI (Body Mass Index) and WHR (Waist- Hip Ratio) for each age group namely- 6, 7, 8, and 9 year tribal boys, and product moment correlation was calculated at 0.05 level of significance. There were significant relationship between BMI and WHR in 9 year tribal boys whereas, no significant relationship were obtained in 6yr, 7yr, and 8yr age group tribal boys.

Singh, K. Singh, P. & Singh, C. (2012) was study to find out anthropometric measurements, body composition and somatotyping differences in high performer and low performer shot putters. 20 male shot putters of age 18 to 25 years were assessed for the present study. Out of which 10 were high performers and 10 were

low performers. All subjects were assessed for height, weight, widths, girths and skinfold thickness. The independent samples t-test revealed that high performer shot putters were significantly taller ($p<0.01$) and had significantly greater all the length measurements when compared to low performer shot putters. The high performer shot putters also possessed significantly greater upper arm ($p<0.05$), forearm ($p<0.01$), chest ($p<0.05$), thigh ($p<0.05$) circumferences and bi-humerus ($p<0.01$), wrist ($p<0.05$), bi-armorial ($p<0.01$), hip ($p<0.05$) diameters as compared to low performer shot putters. Endomorphy ($p<0.05$) was significantly higher in low performers while the lean body mass ($p<0.05$) was significantly greater in high performer shot putters. It is concluded that in most of the parameters there were significant differences between high performer shot putters and low performer shot putters, and the high performer athletes showed better anthropometric measurements and somatotyping scores.

Varghese, R. & Abraham G. (2012) reviews the most current and reliable literature regarding the biological mechanisms of RET for young women subjects. Forty female graduates (n=40) were randomly selected as subjects and their age ranged between 21 and 26 years. The selected subjects were randomly assigned into two equal groups such as experimental group (EG) and control group (CG) with twenty subjects each (n=20). The experimental groups underwent their respective experimental treatment for eight weeks three days per week and a session on each day. Control group was not engaged to any specific training apart from their curriculum. Total cholesterol was taken as variable for this investigation. The pre and post test were conducted one day before and after the experimental treatment. Analysis of covariance (ANCOVA) was used to analyze the collected data. The results revealed that the experimental group (EG) produced

significant improvement (p _ 0.05) due to resistance training on total cholesterol when compared to control group (CG).

Yadav, K. R. Rao, S. K & Sundar, R. U. (2012) was study to compare the Anthropometric Characteristics, Body composition and Somatotype in male intercollegiate Basketball players and Volleyball players of the Karnatak University, Dharwad st: Karnataka. Sixty three players (volleyball N=36 and basketball N=27) of age group 18-25 years were selected from different colleges affiliated to Karnatak University, Dharwad st: Karnataka, India. All the participants were assessed for height, weight, breadths, girths and skin fold thickness. An independent samples t-test revealed that basketball players had significantly higher height ($p<0.01$), weight ($p<0.01$) and body surface area ($p<0.01$) as compared to volleyball players. The basketball players were also found to have significantly greater biceps ($p<0.01$) and suprailliac ($p<0.01$) skin fold thicknesses, calf circumference ($p<0.05$), percent body fat ($p<0.01$), total body fat ($p<0.01$), fat free mass ($p<0.05$) and endomorphic component ($p<0.05$) as compared to volleyball players. Volleyball players had significantly greater body density ($p<0.01$) as compared to basketball players. It is concluded that, in most of the parameters there were significant differences between basketball and volleyball players. The basketball players showed better anthropometric measurements and somatotyping scores.

STATEMENT OF THE PROBLEM

The purpose of the study is to determine the kinanthropometric and physiological variables of Rural and Urban football players in Rajasthan. Therefore the problem is stated as ***"A Comparative study of Kinanthropometric and Physiological Variables of Rural and Urban Football Players in Rajasthan."***

SIGNIFICANCE OF THE STUDY

The present study may be helpful in the following manners: -

1 It will be helpful to differentiate Kinanthropometric variables and physiological variables possessed by different levels of football players and their relation to their performance.

2 From the practical standpoint, this study is important for coaches and trainer to adjust training regimes and concentrate of football players on the variables that are specific to improve performance 'and achieve success in the sports and games.

3 The study will be reveal true facts about football players.

4 The study will help the physical education teachers and coaches to scan the prospective football players.

5 Study may be useful in classification of football players on the basis of Kinathropometric and physiological variables even in the absence of a physical education teacher or coach.

6 The current study helps the coaches, athletes, scientists, sports physiologist, physical fitness trainer and physical educationists to understand the contribution of Kinanthropometric and physiological variables to sports performance of football players and help them to the same line and direction.

7 The result of the study will be providing a useful tool for identification, placement, selection and preparation of Football players for competitions.

Objective of the study

1. To provide a basic foundation in those aspects of Kinanthropometric variables that will be required for further studies.
2. To provide a basic foundation in those aspects of physiology that will be required for further studies in exercise physiology.
3. To bring students with a diversity of life science background, to a common level of understanding of the Kinanthropometirc and physiological principles important in the responses of the human body to sport and exercise.
4. Increase their understanding of how Kinanthropometric and physiological factors influence involvement and performance in sport, exercise, and physical education settings.
5. Increase their understanding of how participation in sport, exercise, and physical education contributes to individual growth and development.

HYPOTHESIS

Based on the literature reviewed, discussion with the experts of the subject and scholars own understanding of the problem following hypotheses is formulated:-

1. There will be no significant difference on Kinanthropometric variables between the Rural and Urban football players in Rajasthan.
2. There will be no significant difference on Physiological variables between the Rural and Urban football players in Rajasthan.

METHODOLOGY

In this chapter selection of subjects, selection of variables, criterion measures, collection of data, experimental design, administrations of tests and statistical technique for the analysis of data have been described.

SELECTION OF SUBJECTS

The subjects for this study will be selected by purposive sampling technique from Rural and Urban School's football players in Rajasthan. Total of 300 male subjects will be selected 150 from each group i.e. Rural and Urban Schools. The age of the subjects will be 14 to 18 years.

VARIABLES OF THE STUDY

The study will be taken on the basis of available Literature on Kinathropometric Variables and Physiological Variables as follow:-

A. Kinanthropometric variables

1 Body weight
2 Height
3 Sitting height
4 Skeletal diameters
   - Knee width
   - Ankle Diameter
5 Body circumferences
   - Thigh Circumference.
   - Calf Circumference.
6 Skinfold thicknesses
   - Thigh Skinfold Width
   - Calf Skinfold Width

B. Physiological variables

1. Vital capacity
2. Blood pressure
3. Pulse rate
4. Resting Heart rate
5. Hemoglobin Content (gm%)
6. Breath holding Capacity

TOOLS TO BE USED

Tools to be used for testing the hypothesis is following: -

A. Kinanthropometric Variables:-

1 Body weight will be measured by weighing machine.

2 Height will be measured by Anthropometer rod.

3 Sitting height will be measured by Anthropometer rod.

4 Skeletal diameters will be measured by sliding calliper/Anthopometric compass.

5 Body circumferences will be measured by Non stretchable steel tape.

6 Skinfold thicknesses will be measured by Harpendon skinfold calliper.

B. Physiological Variables:-

1. Vital Capacity will be measured by wet Spiro meter and will be recorded in litters.
2. Blood pressure will be measured by Sphygmomanometer.
3. Pulse Rate will be measured by counting number of heart beats per minute and will be recorded in numbers.

4. Resting Heart Rate will be measured by counting number of heart beats per minute and will be recorded in numbers. .
5. Haemoglobin content (gm%) will be measured by HB Haemoglobin testing apparatus.
6. Breath holding capacity will be measured by stop watch.

COLLECTION OF DATA

The data of Rural and Urban School's football players will be collected by scholar along with trained tester from their respective schools.

TESTER RELIABILITY

The personnel's / Physical education teacher those who will be involved in conduct afferent test will be trained.

STATISTICAL TECHNIQUE FOR ANALYSIS OF DATA

To characterize Rural and Urban School's Football Players in Rajasthan to their standard human performance measures by selected Kinanthropometric and physiological variables appropriate static technique will be used i.e. mean, standard deviation, 't' test and 'ANOVA'.

DELIMITATIONS

The study will be further delimited to the following:-

1. The study will be delimited by Rural and Urban School's football players of Rajasthan.

2 The study will be delimited by following variables:-

A. Kinanthropometric variables

1 Body weight

2 Height

3 Sitting height

4 Skeletal diameters

- Knee width
- Ankle Diameter

5 Body circumferences

- Thigh Circumference.
- Calf Circumference.

6 Skinfold thicknesses

- Thigh Skinfold Width
- Calf Skinfold Width

B. Physiological variables

1 Vital capacity

2 Blood pressure

3 Pulse rate

4 Resting Heart rate

5 Hemoglobin Content (gm%)

6 Breath holding Capacity

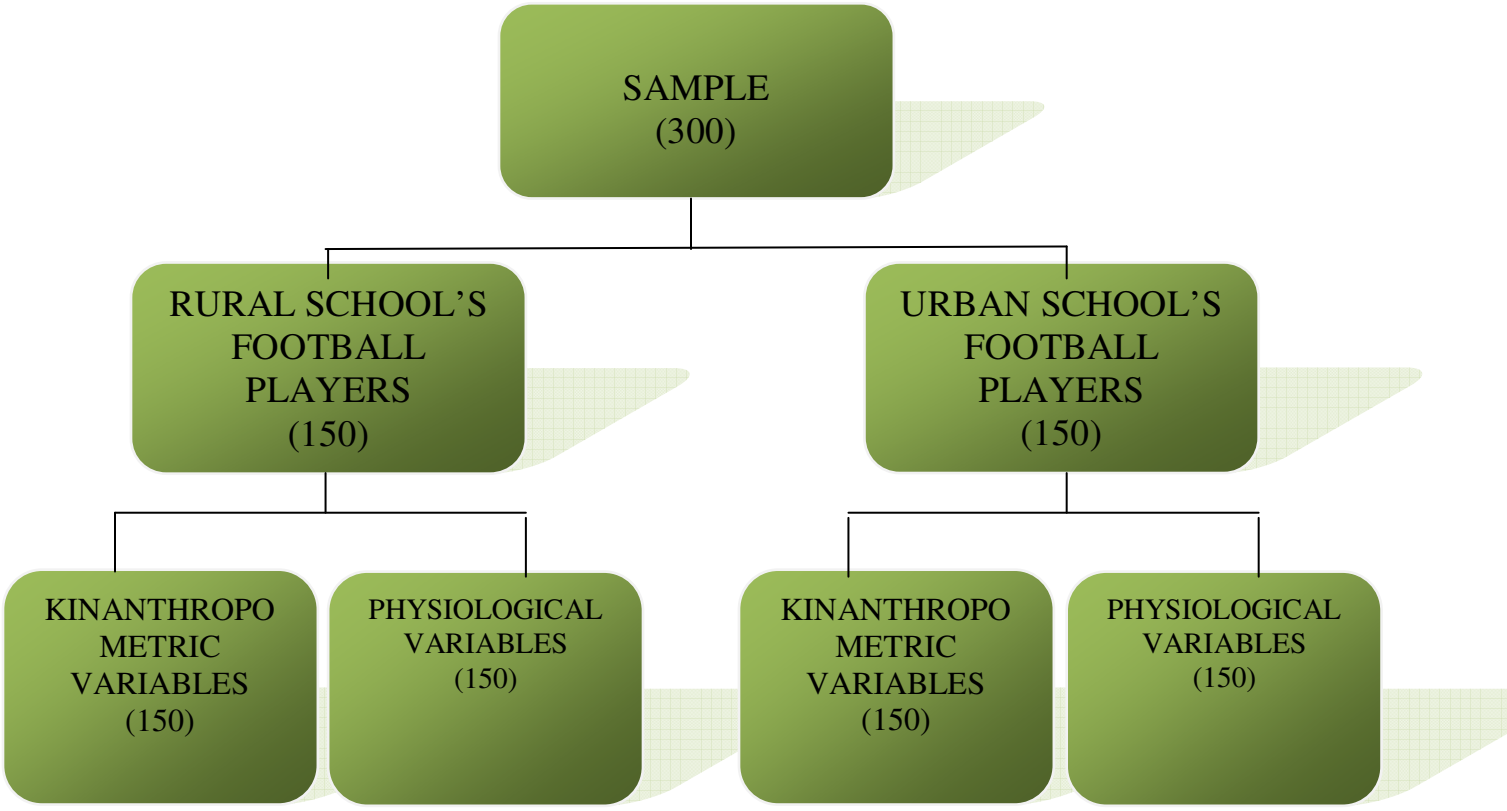
3. The study will be delimited to the players of 14-18 years of age.

LIMITATIONS

1. Heredity and Environment factors, which contribute to Kinanthropometric and physiological efficiency, could not control.
2. In order to assess Kinanthropometric measurement standard apparatus will be used.

3. For asses physiological variables standardize instruments will be used.
4. The entire tests will be conducted at respective school premises. .
5. No special technique of motivation will be used while collection of data on Rural and Urban School's football players, which may be considered as one of the limitation.

Research Design



Bibliography

Books

1 Clark, H. H. & Clark, D. H. (1987) *Application of Measurement of Physical Education.* (New Jersey: Prentice Hall Inc.).

2 Johnson, B.L. & Nelson, J.K. (1982) *Practical Measurement for Evaluation in Physical Education*. New Delhi: Surjeet Publication.

3 Kansal, D.K. (1996) *Test and Measurement in Sports and Physical Education.* New Delhi: D.V.S. Publications.

4 Mathews, D.K. (1978) *Measurement In Physical Education*. (Philodelphia: W.B. Saunders Company).

Journals

1. Abraham, G. (2010) Analysis of anthropometry, body composition and performance variables of young Indian athletes in southern region. *Indian Journal of Science and Technology.* Vol. 3. No.12. pp-1210-1213.

2. Bester , M. Crous , M.M. Kidd, L.C. & Harley, M. Y.X.R. (2007) Hip Extensor Muscle Strength in Elite Female Field Hockey Players : Kinanthropometry. *African Journal for P hysical Health Education, Recreation and Dance.* Volume Issue 2. pp-135 - 148.

3. Cormery, , B. Marcill, M. & Bouvard, M. (2008)) Rule change incidence on physiolo gical characteristics of elite basketball players: a 10-year-period investigation. *British Journal of Sports Medicine.* (42). pp- 25-30.

4. Dey, S. K. Kar, N. & Debray P. (2010) Anthropometric, Motor Ability and Physiological Profiles of Indian National Club Footballers: A Comparative Study. *South African Journal for Research in Sport, Physical Education and Recreation.* 32(1). *pp-43-56.*

5. Ducan, M.J. Woodfield, L. & Al-Nakeeb, Y. (2006) Anthropometric and physiological Characteristics of Junior Elite Volleyball players. *British Journal of Sports Medicine.* 40-4 .pp-149-154.

6. Gaurav, V. Singh M. & Singh S. (2010) Anthropometric Characteristics, Somatotyping and Body Composition of Volleyball and Basketball Players. *Journal of Physical Education and Sports Management t.* Vol. 1(3). pp- 28-32.

7. Karkare, A. (2011) Anthropometric measurements and body composition of hockey players with respect to their playing positions. *Indian Streams Research Journal. Vol.1. Issue.X. Pp-1-4.*

8. Karkare, A. & Bhotmange S. (2012) A Study on Body Composition and Aerobic Capacity of Handball Players Participate in Different Level of Competition. *Indian Streams Research Journal,* Volume 2, Issue. 9. pp-1-4.

9. Koley et al.(2011) Arm anthropometric profile in Indian university basketball players. *Serb J Sports Sci* 5(1). pp- 35-40.

10 Marcus et al. (2004) Comparison of Selected Physical Fitness and performance Variables Between NCAA Division I and II Football Player. *Journal of Strength and Conditioning Research*, 2004, 18(2), 292–297.

11 Niekerk, L. V. Coetzee, M. Monyeki, M.A. & Pienaar, A. (2007) Anthropometric and Motor Development Profiles of Street Children Living in a Shelter: Kinanthropometry. *African Journal for Physical Health*

Education, Recreation and Dance. Volume 13. Issue 2**.** pp- 127-134.

10. Priya, K.B. Gopinath, R. & Raja, S. C. (2012) Effect Of Yogic Practices And Physical Exercises On Blood Glucose And High Density Lipoproteins Among Diabetes Patients. *International journal of Health, Physical Education and Computer Science in Sports.* Volume No.5. No.1. pp- 30-32.

11. Sharma, A, Tripathi, V. & Koley S. (2012) Correlations of Anthropometric Characteristics with Physical Fitness Tests in Indian Professional Hockey Players. *J. Hum. Sport Exerc.* Vol. 7, No. 3. pp- 698-705.

12. Singh, A. B. (2012) Relationship Of Selected Anthropometric Measurements Between BMI And WHR In Tribals Boys Of Age 6 Through 9 Years *International Journal of Health, Physical Education and Computer Science in Sports* Volume .5. No.1. pp-37-39.

13. Singh, K. Singh, P. & Singh, C. (2012) Anthropometric Characteristics, Body Composition and Somatotyping of High and Low Performer Shot Putters. *International Journal of Sports Science and Engineering.* Vol. 06. No. 03. pp-153-158 .

14. Singh, S. Singh, K. & Singh, M. (2011) Anthropometric characteristics and body types of high performer and low performer hammer throwers. *Brazilian Journal of Biomotricity*. V. 5. pp-80-86.

15. Soh, K.G. Soh, K.L., Fauzee, O. M., Sofian O.F., Marjohan; J. S.L. & Noorzaliza O. (2008) Body Fat and Somatotype Among Malaysian School

Sports Council Netball Players By Playing Position: Kinanthropometry. *African Journal for Physical Health Education, and Dance.* Volume 14. Issue 4. Pp- 456 - 462.

16. Varghese, R. & Abraham, G. (2012) Resistance Exercise Training Programme And Its Impact On Total Cholesterol Of Women Graduates. *International Journal of Health, Physical Education and Computer Science in Sports.* Volume No.5. No.1. pp-33-36.

17. Yadav, K. R. Rao, S. K & Sundar, R. U. (2012) Evaluation of Anthropometric Body Composition and Somatotyping of Volleyball and Basketball Players. *International Journal of Health, Physical Education and Computer Science in Sports.* Volume No.5. No.1. pp43-48.

Webliography

1 https://www.researchgate.net/publication.

2 http://www.ro.ecu.edu.au/theses.